

Smart Contracting And The New Digital Directives: Some Initial Thoughts

by Andre Janssen*

Abstract: In this article, smart contracting meets the Directive (EU) 2019/770 on certain aspects concerning contracts for the supply of digital content and digital services, and the Directive (EU) 2019/771 regarding certain aspects of contracts for the sale of goods. Much has been written about smart contract-

ing and the two directives. What has been missing, however, are contributions that explicitly address the question of whether the two directives mentioned are really “smart contracts ready”. The present article is intended to fill this gap and to serve as an incentive to take a closer look at this topic.

Keywords: Smart contracts; digital content directive; new consumer sales directive; cryptocurrency payment

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A. Introduction

1 The article deals with smart contracting in the context of digital directives, more precisely the Directive (EU) 2019/770 on certain aspects concerning contracts for the supply of digital content and digital services (hereinafter: the Digital Content Directive) and the Directive (EU) 2019/771 certain aspects concerning contracts for the sale of goods (hereinafter: the New Consumer Sales Directive).¹ This is challenging for

several reasons: first, so much has been written about both smart contracts² and the two significant

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1 The article is based on a presentation given by the author at the online conference “Digital Consumer Contract Law and New Technologies”, which took place on 26 and 27 November 2020. The conference was organised by Professor Karin Sein (University of Tartu, Estonia) and Professor Martin Ebers (University of Tartu, Estonia). The event was

part of the project “PRG124 Protection of consumer rights in the Digital Single Market - contractual aspects”, which is funded by the Estonian Research Council. The lecture format was largely retained.

2 See for example C. Buchleitner & T. Rabl, ‘Blockchain und Smart Contracts’ (2017) *ecolex*, 4-14; A.J. Casey & A. Niblett, ‘Self-Driving Contracts’ (2017) 43 *Journal of Corporation Law*, 1-33; M. Durovic & A. Janssen, ‘Formation of Smart Contracts’, in Larry A. DiMatteo, Michel Cannarsa, Cristina Poncibò (eds.), *The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms*, Cambridge (Cambridge University Press) 2019, pp. 61 ff.; M. Durovic & A. Janssen, ‘The Formation of Blockchain-based Smart Contracts in the Light of Contract Law’ (2018) *European Review of Private Law (ERPL)*, 753-772; N. Guggenberger, ‘The Potential of Blockchain for the Conclusion of Contracts’, in R. Schulze, D. Staudenmeyer & S. Lohse (eds.) *Contracts for the Supply of Digital Content: Regulatory Challenges and Gaps* (Nomos 2017), 83-97; A. Janssen, ‘Demystifying Smart Contracts’, in C.J.H. Jansen, B.A. Schuijling, I.V. Aronstein (eds.), *Digitalisering en onderneming* (Wolters Kluwer 2019),

directives³ that one runs the risk of confirming *Karl Valentin*, who once ironically claimed ”(e)verything has already been said, just not by everyone.”⁴ So at the outset my question was whether anything new can really be added to the whole discussion without repeating too much that is already known. As the following remarks will hopefully prove, this question can be answered in the affirmative. Second, and this was also a challenge when writing this article, there is surprisingly almost no specific explanation of how smart contracting relates to the two directives. One finds, therefore, almost a *tabula rasa* as to what extent the two directives are “smart contracts ready” or what problems are to be expected or solved in this regard in the future.

- 2 This article attempts to shed light on some aspects of this topic but is by no means meant to be comprehensive. The next chapter (B.) gives a brief

15-29; M. Kaulartz & J. Heckmann, ‘Smart Contracts – Anwendung der Blockchain-Technologie’ (2016) *Computer und Recht (CR)*, 618-624; M. Kaulartz, ‘Herausforderungen bei der Gestaltung von Smart Contracts’ (2016) *Zeitschrift zum Innovations- und Technikrecht (InTeR)*, 201-206; E. Mik, ‘Smart Contracts: Terminology, Technical Limitations and Real World Complexity’ (2017) 10 *Journal of Law, Innovation and Technology (JLIT)*, 269-300; M. Raskin, ‘The Law and Legality of Smart Contracts’, (2017) 1 *Georgetown Technology Review*, 305-341; J.M. Sklaroff, ‘Smart Contracts and the Cost of Inflexibility’ (2017) 166 *University Pennsylvania Law Review*, 263-303; T.F.E. Tjong Tjin Tai, ‘Smart contracts en het recht’ (2017) 93 *Nederlands Juristenblad*, 176-182; K. Werbach & N. Cornell, ‘Contracts Ex Machina’ (2017) 67 *Duke Law Journal*, 313-382.

- 3 See for example I. Bach, ‘Neue Richtlinien zum Verbrauchsgüterkauf und zu Verbraucherverträgen über digitale Inhalte’ (2019) *Neue Juristische Wochenschrift (NJW)*, 1705-1711; J. Morais Carvalho, ‘Sale of Goods and Supply of Digital Content and Digital Services – Overview of Directives 2019/770 and 2019/771’, (2019) *Journal of European Consumer and Market Law (EuCML)*, 194-201; L. K. Kumkar, ‘Herausforderungen eines Gewährleistungsrechts im digitalen Zeitalter’, (2020) *Zeitschrift für die gesamte Privatrechtswissenschaft (ZfPW)*, 306-333; J. Lommatzsch, R. Albrecht/P. Prüfer, ‘Zwei neue EU-Richtlinien zum Vertragsrecht – „Revolution“ im Verbraucherrecht?’, (2020) *Gesellschafts- und Wirtschaftsrecht (GWR)*, 331-339; D. Staudenmayer, ‘Die Richtlinien zu den digitalen Verträgen’, (2019) *Zeitschrift für Europäisches Privatrecht (ZEuP)*, 663-694; D. Staudenmayer, ‘The Directives on Digital Contracts: First Steps Towards the Private Law of the Digital Economy’, (2020) *European Review of Private Law (ERPL)*, 219-249; J. Vanherpe, ‘White Smoke, but Smoke Nonetheless: Some (Burning) Questions Regarding the Directives on Sale of Goods and Supply of Digital Content’, (2020) *European Review of Private Law (ERPL)*, 251-273.

- 4 See <https://www.zitate.eu/autor/karl-valentin-zitate/177935>.

introduction to the world of smart contracting, followed by the third chapter (C.), in which a fictitious smart contract scenario is presented for further illustration. The fourth chapter (D.) uses this scenario to examine two problems that can arise with smart contracts in the context of the two digital directives. The focus is to a large extent on the New Consumer Sales Directive and to a lesser extent on the Digital Content Directive. The article ends with a short conclusion (E.).

B. A short introduction to smarting contracting

- 3 An introduction to the world of smart contracting seems unavoidable if one wants to fully grasp the legal problems that may arise in the context with the two digital directives. This chapter will therefore briefly define the general term “smart contracts”, then explain the importance of blockchain technology for the development of smart contracting and conclude with some potential areas of application of smart contracts.⁵

I. Defining smart contracts

- 4 Smart contracts raise interesting questions about their legal nature. It is often only said that the existing smart contracts are neither particularly smart nor they are even strictly speaking legally binding contracts at all.⁶ Any discussion about smart contracts must begin with the definition of the concept.⁷ There are numerous definitions of

5 This chapter contains elements from the previous publications A. Janssen, ‘Demystifying Smart Contracts’, in C.J.H. Jansen, B.A. Schuijling, I.V. Aronstein (eds.), *Digitalisering en onderneming* (Wolters Kluwer 2019), 16-21 and M. Durovic & A. Janssen, ‘Formation of Smart Contracts’, in Larry A. DiMatteo, Michel Cannarsa, Cristina Poncibò (eds.), *The Cambridge Handbook of Smart Contracts, Blockchain Technology and Digital Platforms*, Cambridge (Cambridge University Press) 2019, pp. 61 ff.

6 S. Bourque & S. Fung Ling Tsui, *A Lawyer’s Introduction to Smart Contracts* (Lask: Scientia Nobilitat, 2014), p. 4; R. O’Shields, ‘Smart Contracts: Legal Agreements for the Blockchain’ (2017) 21 *North Carolina Banking Institute*, 177-178.

7 For more details see M. Durovic & A. Janssen, ‘The Formation of Blockchain-based Smart Contracts in the Light of Contract Law’ (2018) *European Review of Private Law (ERPL)*, 754 ff.

what smart contracts are.⁸ They are often defined as a special protocol intended to contribute, verify or implement the negotiation or performance of the contract in a trackable and irreversible manner without the interference of third parties.⁹ One can go back to Nick Szabo, who in the 1990s, defined for the first time a smart contract as a:

“computerized transaction protocol that executes the terms of a contract. The general objectives of smart contract design are to satisfy common contractual conditions (such as: payment terms, liens, confidentiality, and enforcement etc.), minimize exceptions both malicious and accidental, and minimize the need for trusted intermediaries like banks or other kind of agents.”¹⁰

- 5 Related economic goals of smart contracts include reducing loss by fraud, enforcement costs, or other transaction costs. They are presumed to be able to provide full transparency of the transaction and to grant a high degree of privacy contemporaneously.¹¹ Szabo’s definition can be simplified to a computer code that is created to automatically execute contractual duties upon the occurrence of a trigger event as a “digital condition precedent”,¹² or agreements wherein execution is automated, usually by a computer programme.¹³ A minimum consensus definition can be distilled: a smart contract is a form of computer code which is self-executing and self-enforcing.¹⁴ As the current smart

contracts work without self-learning systems, it has to be emphasised that they neither need artificial intelligence nor deep learning.¹⁵

- 6 Needless to say, there are many debates and confusions on the legal concept of smart contracts. For blockchain-based smart contracts which will be discussed soon in this contribution, a useful dichotomy can be drawn between the “smart contract code”, which is the computer code stored, verified and executed in a blockchain, and the “smart legal contract”, which is a complement (or maybe even a substitute) for a legal contract to apply such technology.¹⁶ In essence, a “smart legal contract” is a combination of the ‘smart contract code’ and traditional legal language.¹⁷ A smart contract is a computer code that specifies in ‘if this happens that shall happen’ language, in a way understandable to a computer. Once verified, it will self-execute and self-enforce by recognizing an occurred triggering event and dispensing the assets accordingly.¹⁸
- 7 It is evident that the term smart contract is a misnomer.¹⁹ A smart contract, as we know it right now, is independent from the applicable law, as it is not a contract in the legal meaning. The choice of such name for the concept of a self-executing and computer-coded agreement is unfortunate as it exacerbates confusion. Some theoretical similarities, however, exist between smart contracts

8 A good overview over the difference smart contracts definitions gives M. Finck, ‘Grundlagen und Technologie von Smart Contracts’, in M. Fries & B.P. Paal (eds.), *Smart Contracts* (Mohr Siebeck 2019), 1-12.

9 See e.g. T. Söbbing, ‘Smart Contracts und Blockchain: Definitionen, Arbeitsweise, Rechtsfragen’ (2018) *IT-Rechts-Berater (ITBR)*, 43-46.

10 N. Szabo, ‘Smart Contracts’, <http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html>

11 C. Buchleitner & T. Rabl, ‘Blockchain und Smart Contracts’ (2017) *ecolex*, 4, 5; N. Guggenberger, ‘The Potential of Blockchain for the Conclusion of Contracts’, in R. Schulze, D. Staudenmeyer & S. Lohse (eds.) *Contracts for the Supply of Digital Content: Regulatory Challenges and Gaps* (Nomos, 2017), 83, 94.

12 P. Paech, ‘The Governance of Blockchain Financial Networks’, (2017) 80 *Modern Law Review*, 1072, 1082.

13 M. Raskin, ‘The Law and Legality of Smart Contracts’, (2017) 1 *Georgetown Technology Review*, 305, 306.

14 A. Börding, T. Jülicher, C. Röttgen & M. von Schönfeld, ‘Neue Herausforderungen der Digitalisierung für das deutsche

Zivilrecht: Praxis und Rechtsdogmatik’ (2017) *Computer und Recht (CR)*, 134, 138; E. Mik, ‘Smart Contracts: Terminology, Technical Limitations and Real World Complexity’ (2017) 10 *Journal of Law, Innovation and Technology (JLIT)*, 269, 269; R. O’Shields, ‘Smart Contracts: Legal Agreements for the Blockchain’ (2017) 21 *North Carolina Banking Institute*, 177, 179.

15 M. Kaulartz & J. Heckmann, ‘Smart Contracts – Anwendung der Blockchain-Technologie’ (2016) *Computer und Recht (CR)*, 618, 618.

16 J. Stark, ‘Making Sense of Blockchain Smart Contracts’, *Coindesk*, Jun 4 2016, www.coindesk.com/making-sense-smart-contracts/

17 M. Kaulartz, ‘Herausforderungen bei der Gestaltung von Smart Contracts’ (2016) *Zeitschrift zum Innovations- und Technikrecht (InTeR)*, 205.

18 T.F.E. Tjong Tjin Tai, ‘Smart contracts en het recht’ (2017) 93 *Nederlands Juristenblad*, 177.

19 C. Buchleitner & T. Rabl, ‘Blockchain und Smart Contracts’ (2017) *ecolex*, 6.

and legal contracts insofar as both 'are frameworks for regulating the interaction between different entities.'²⁰

- 8 As for the question regarding how a smart contract works in practice and how it is concluded, Szabo uses his famous vending machine analogy.²¹ A vending machine takes coins and dispenses change and product according to the displayed price. Once the coins are inserted, there is no further human intervention required to conclude and later execute the contract. Similar to a smart contract, a contract concluded through a vending machine is also in principle immutable and self-enforcing. Even if a person were forced to buy something from the vending machine, the machine would still give the product to the person regardless the fact that the transaction is legally invalid *ex tunc* due to duress. Furthermore, in theory, anybody with coins can participate in an exchange with the vendor regardless of the legal capacity of the contracting parties. Where smart contracts go further is "in proposing to embed contracts in all sorts of property that is valuable and controlled by digital means".²² Essentially, once both parties agree on a smart contract, its execution is taken from their control.

II. Blockchain technology as the driver for smart contracting

- 9 Smart contracts do not necessarily require blockchain technology.²³ However, there is little doubt that the main reason for the increasing importance of smart contracts is the rise of blockchain technology, as it allows smart contracts to use their full automation potential. *Bitcoin*, which proliferated this technology, led ultimately to the establishment of *Ethereum*, a

sophisticated and prominent blockchain platform allowing more complicated (i.e. smart contract) transactions beyond transfers of virtual currencies.²⁴ In the meanwhile several other blockchain-based smart contract platforms such as *Hyperledger Burrow*, *Hyperledger Fabric*, *Open Transactions*, and *Quorum* have also entered the market. The blockchain technology demonstrates how a network could be set up so that once a transaction is set in motion, the network can produce outputs autonomously without the direct intervention of any party or other intermediaries.²⁵ Because of this feature, it is often said that the contracting parties do not need to trust each other, they can rely on the system as a whole to carry out transactions knowing that the other party cannot frustrate the intended outcome. Blockchain not only allows verification of each transaction through the nodes (the computers in the chain), but it also, by storing the contract in a "block" and sending it to each node, makes the execution automatic and, in principle, immutable. Thus, smart contracting allows the "digitization of trust through certainty of execution" and the "creation of efficiency through removal of intermediaries and the costs they bring to the "transactions".²⁶ These characteristics are perhaps the greatest appeal of blockchain-based smart contracts.

- 10 When describing the actual process of formation of smart contracts, the concept can be best explained through Ethereum's process.²⁷ First, the user first types out the contract in Ethereum's coding language called "solidity",²⁸ for which the user has to download the Ethereum software and be part of its network. Then he will "propose" a specific contract by making it available in the system. The contract will have its own identification number and functions as an autonomous entity within the system. Another user may then accept the proposed contract by communicating to it. For instance, he communicates by making a payment, regularly in "Ether (ETH)", the virtual currency of Ethereum. After that communication of the other party, the smart contract will execute itself. It is important to

20 C. Lim, T.J. Saw & C. Sargeant, 'Smart Contracts: Bridging the Gap Between Expectation and Reality', 11 July 2016, *Oxford Business Law Blog*, www.law.ox.ac.uk/business-law-blog/blog/2016/07/smart-contracts-bridging-gap-between-expectation-and-reality.

21 N. Szabo, 'Formalizing and Securing Relationships on Public Networks' *First Monday*, 2 (9), <https://doi.org/10.5210/fm.v2i9.548>.

22 N. Szabo, 'Formalizing and Securing Relationships on Public Networks' *First Monday*, 2 (9), <https://doi.org/10.5210/fm.v2i9.548>.

23 *Blockchain (technology)* is sometimes also referred to as *distributed ledger (technology)* or *shared ledger (technology)*. While these three notions still remain in flux (and some authors consider them to designate different forms of technology), this contribution will for the sake of simplicity only use the term *blockchain (technology)*.

24 See more detailed T.F.E. Tjong Tjin Tai, 'Smart contracts en het recht' (2017) 93 *Nederlands Juristenblad*, 176, 177.

25 Clifford Chance, 'Smart Contracts. Legal Agreements for the Digital Age', https://www.cliffordchance.com/briefings/2017/06/smart_contracts_-legalagreementsforth.html

26 J. I-H Hsiao, 'Smart Contract on the Blockchain-Paradigm Shift for Contract Law' (2017) 14 *US-China Law Review*, 685, 687.

27 <https://ethereum.org/>

28 See: <https://solidity.readthedocs.io/en/develop/>

note that to conduct a transaction or to execute a contract on the Ethereum blockchain platform the users need to pay “gas”, which is a computation fee.²⁹ Gas is priced in small fractions of Ether called “gwei” and it is used to allocate resources of the Ethereum Virtual Machine (EVM) so that decentralized applications such as smart contracts can ultimately self-execute in a secured but decentralized way. The fee is paid to the miners for mining transactions, putting them into blocks.³⁰ The exact price of the gas is determined by supply and demand between the network’s miners. They can decline to process a transaction if the gas price does not meet their threshold, and users of the network who seek processing power.

III. Some (potential) fields of application for smart contracting

- 11 There are many (potential) fields of application for smart contracts. Besides the well-known smart refrigerator example (the refrigerator “orders” automatically food or beverages within a previously concluded delivery smart contract) the “pay as you drive-principle” is subject to discussions in the insurance industry right now.³¹ Here the policyholder concludes a (smart) car insurance contract with the insurance company. The contract contains a “pay as you drive-provision” which means the riskier the policyholder drives, the higher his premium. For data collection, the policyholder’s car has a blockchain interface and the blockchain-based smart (insurance) contract automatically adjusts the amount of the payable premium according to the manner the insured car is driven. A similar idea is “drive as long as you pay” where a car can only be driven as long as the premiums are paid. If premiums have not been paid, the blockchain-based smart insurance contract uses the smart lock of the car to block the further use of the vehicle.³² There is also

²⁹ See more detailed: <https://www.investopedia.com/terms/g/gas-ethereum.asp>

³⁰ The users are paying for the computation, regardless of whether the transaction succeeds or not. Even if it fails, the miners must validate and execute your transaction, which takes computational power. Hence, users must pay for that computation just like they would pay for a successful transaction.

³¹ C. Buchleitner & T. Rabl, ‘Blockchain und Smart Contracts’ (2017) *ecolex*, 4, 7; M. Kaulartz & J. Heckmann, ‘Smart Contracts – Anwendung der Blockchain-Technologie’ (2016) *Computer und Recht (CR)*, 618, 618.

³² F. Hofmann, ‘Smart contracts und Overenforcement’, in M. Fries & B. P. Paal (eds.), *Smart Contracts* (Mohr Siebeck 2019),

the idea of combining smart contracts and smart meters in order to automatically cut off the supply of gas, water, and electricity in case of unpaid bills.³³

C. The fictitious smart contract scenario

- 12 Let us now turn to the fictitious smart contract scenario, which will serve as an illustration in the further course of this article. I will refrain from presenting some of the technical intricacies, as they do not appear to be of importance for the legal solution. Let us assume that a consumer wants to buy a new car from a professional seller that has an integrated smart lock, i.e. a smart device. For this purpose, the two parties conclude an Ethereum-based smart contract. The payment by the consumer is to be made in monthly instalments, in Ether, i.e. Ethereum’s currency. As long as the consumer meets the monthly instalment payments, the car’s smart lock will open normally, allowing unrestricted use of the car. However, if the consumer defaults on an instalment, the smart contract automatically blocks the car’s smart lock, which can no longer be used until payment. In our small example, the consumer pays his monthly instalments on time, but due to a programming error in the smart contract software of Ethereum (there is no input error on the seller’s side), the smart contract blocks the smart lock of the car. As a result, the consumer can no longer use the vehicle.

D. Discussion of two smart contracts related problems in the context of the new digital directives

- 13 As already mentioned earlier in the introduction, two possible problems that may arise with smart contracts in the context of the two digital directives will now be presented using the example presented. The focus is primarily on two problem areas related to the application of the New Consumer Sales Directive, whereby the Digital Content Directive will also be discussed.

125, 128.

³³ F. Hofmann, ‘Smart contracts und Overenforcement’, in M. Fries & B. P. Paal (eds.), *Smart Contracts* (Mohr Siebeck 2019), 125, 128.

I. Is a smart contract with a virtual currency payment obligation governed by the New Consumer Sales Directive?

- 14 The opening of the scope of application of the New Consumer Sales Directive could be problematic in the present case because no payment in a regular currency such as the Euro or US-dollar was agreed; however, a “payment” in a virtual currency (here “Ether”) was provided for. This is not necessarily a sole smart contract problem, because “ordinary non-smart contracts” can provide for a “payment” in a virtual currency. Nevertheless, it is currently the case that this problem arises primarily with smart contracts, which is why it seems justified to identify this primarily as a “smart contract problem”.
- 15 But what exactly is the problem with the New Consumer Sales Directive and “payment” in virtual currency? Let us take a closer look at the provisions of the Directive. Art. 3(1) of the New Consumer Sales Directive states that “(t)his Directive shall apply to sales contracts between a consumer and a seller.”³⁴ Art. 2 no. 2 of the New Consumer Sales Directive defines the term “sales contract” as follows: “sales contract” means any contract under which the seller transfers or undertakes to transfer ownership of goods to a consumer, and the consumer pays or undertakes to pay the price thereof”.³⁵ Certainly, “payment of price” covers payments in regular currency. But are “goods for virtual currency contracts” also covered by the New Consumer Sales Directive? The Directive itself does not provide any further explanation of what is meant by a “payment of price” according to Art. 2 no. 2 of the New Consumer Sales Directive. The legislative history and the literature are also, as far as can be seen, unproductive in solving this question.
- 16 If this were not in itself already a significant problem for the interpretation of the New Consumer Sales Directive, the situation becomes even more confusing when one looks at the Digital Content Directive. Both directives are to be understood as twin directives, where the New Consumer Sales Directive covers the area of goods and goods with digital elements, while the Digital Content Directive regulates the supply of digital content and digital services. According to Art. 3(1)1 of the Digital Content Directive, the Directive applies “to any contract where the trader supplies or undertakes to supply digital content or a digital service to the consumer and the consumer pays or undertakes to pay a price.”³⁶ However, unlike the New

Consumer Sales Directive, the Digital Consumer Sales Directive defines the term “price” in Art. 2(7) Digital Content Directive, according to which “price” means money “or a digital representation of value that is due in exchange for the supply of digital content or a digital service”.³⁷ Recital 23 of the Digital Content Directive provides further information on the background to the inclusion of “digital representations of value” in the Digital Content Directive and what exactly is meant by this. According to that recital:

*“(…) (d)igital representations of value should also be understood to include virtual currencies (...). Differentiation depending on the methods of payment could be a cause of discrimination and provide an unjustified incentive for businesses to move towards supplying digital content or a digital service against digital representations of value. (...)”*³⁸

- 17 The Digital Content Directive thus makes it unmistakably clear that the scope of application of the Directive is also open in the cases of “payments in virtual currency” and gives a convincing reason for this. After all, with the increasing popularity of virtual currencies as a means of payment, this is the only way to prevent companies from escaping the requirements of the Digital Content Directive by demanding “virtual currencies payments” with consumers. If our example case had been about the supply of digital content or digital service and not about goods (with digital elements), the scope of application of the Digital Content Directive would undoubtedly have been given. Why the European Union is obviously pursuing two different approaches regarding payment in virtual currencies, or at least is introducing a great deal of interpretational uncertainty into the New Consumer Sales Directive, is not apparent and also eludes a deeper logic. Of course, there is the same incentive for businesses to escape the scope of the New Consumer Sales Directive by demanding a “payment” in virtual currencies and thus to undermine its protection standard as with the Digital Content Directive. Ultimately, this is precisely why there could be an increased use of virtual currencies in the area of consumer sales in the future.
- 18 Overall, the result to the problem of “payment in virtual currencies” can be described as disappointing. Firstly, because the New Consumer Sales Directive seems to contain a loophole that could make it possible for businesses to systematically undermine the standard of protection.³⁹ And this issue might even

34 Emphasis added in quote by the author.

35 Emphasis added in quote by the author.

36 Emphasis added in quote by the author.

37 Emphasis added in quote by the author.

38 Emphasis added in quote by the author.

39 So far, many companies are still reluctant to do so because the value of many virtual currencies still fluctuates too much. However, there are already virtual currencies whose

become a potential preliminary question for the European Court of Justice to answer whether “goods for virtual currency contracts” must be considered as “sales contracts” under the New Consumer Sales Directive. On the other hand, it also seems to be a missed opportunity to further harmonise the *acquis communautaire* in a meaningful way, even though the EU member states are free to extend the scope of the New Consumer Sales Directive to contracts in which goods are purchased for virtual currencies. Nevertheless, a clear solution for both digital directives in this regard is preferred.

II. Should smart contracts be considered as a “digital element” of a sold item under the New Consumer Sales Directive?

19 Let us now assume that in our example the present contract is undoubtedly a “sales contract” in the sense of the New Consumer Sales Directive, because payment potentially had to be made in euros and not in a virtual currency. The starting point, that it is a sale of “goods with digital elements”⁴⁰ according to Art. 3(1), (2) and Art. 2 no. 5 of the New Consumer Sales Directive, is also undoubted. The car sold is a tangible movable item according to Art. 2 no. 5 of the New Consumer Sales Directive that incorporates or interconnects with digital content or a digital service (here, the smart lock with its digital functions) in such a way that the absence of that digital content respectively digital service would prevent the good (here, the car) from performing its functions. The New Consumer Sales Directive therefore applies to the car itself including its smart lock.

20 The elephant in the room is, of course, whether the New Consumer Sales Directive also covers the (defective) smart contract component of Ethereum (as a “digital element” of the car), which was ultimately responsible in the example for the consumer no longer being able to use the car. Alternatively, is the defective smart contract component rather regulated by the Digital Content Directive since this Directive is ultimately aiming at regulating the supply of digital content and digital services? The importance of deciding which directive covers the smart contract component quickly becomes apparent when considering the legal consequences of this decision. If one concludes that the New Consumer Sales Directive also covers the defective smart contract component, the consumer has direct rights arising from that non-conformity

value is proving to be relatively stable, such as “Tether”.

40 Emphasis added in quote by the author.

against the seller. The seller’s liability risk would then increase accordingly, even though he would have a right of redress under Art. 18 of the New Consumer Sales Directive against Ethereum after the consumer has made a claim against the seller.⁴¹ If, on the other hand, the Digital Content Directive were to apply to the smart contract component, the consumer would have to turn directly to Ethereum, as the digital content comes from the digital service provider itself; in this case, the seller could not be held liable for the defective smart contract element.

21 On the whole, the better arguments seem to speak in favour of also subjecting smart contract elements to the scope of the New Consumer Sales Directive as a “digital element” and not to the Digital Content Directive. The wording of Art. 3(3)2, Art. 2 no. 5 of the New Consumer Sales Directive is broad enough to justify such an interpretation. It could be argued that the car is interconnected in such a way with the smart contract that the absence of it prevents the car from performing. Finally, the example shows that the car cannot be used without a faultless smart contract. The fact that the smart contract element comes from a third party (in the example, Ethereum) and not from the seller is irrelevant.⁴² Also, a broad interpretation of Art. 3(3)2 of the New Consumer Sales Directive could justify that the digital service running the smart contract is also provided with the car under the sales contract.

22 Nevertheless, it must be admitted that the wording of Art. 3(3)2, Art. 2 no. 5 of the New Consumer Sales Directive would also allow for another, narrower interpretation. Accordingly, the strongest reason for including the smart contract component as a “digital element” in the scope of the New Consumer Sales Directive seems to be the aim of an effective consumer protection. For if one takes the perspective of the consumer, it becomes clear that it will often be impossible, or at least very difficult, for him to see why the purchased goods do not work. In our example, how is it possible for the consumer to realise why the smart lock cannot be opened? In the end, he will not be able to recognise whether the smart lock itself is defective or whether the problem comes from the area of the smart contract. The consumer cannot be burdened with such an obligation to examine, especially since he will usually lack the necessary expertise anyway. The objective of the New Consumer Sales Directive was to establish a *one-stop-only policy* for the consumer in the marginal area of goods and digital content and digital services in order to ensure effective consumer protection. If one really wants to meet

41 See for the right of redress Art. 18 of the New Consumer Sales Directive.

42 See Art. 3(3)2 of the New Consumer Sales Directive.

this objective, the smart contracts elements should be subject to the New Consumer Sales Directive. That this leads to an extended liability of the seller for defective digital content or digital services of third parties is as previously mentioned not alien to the New Consumer Sales Directive, but is part of its concept.⁴³ As a final “ultima ratio argument” for the inclusion of the smart contracts component into the scope of the New Consumer Sales Directive, Art. 3(3)3 of the New Consumer Sales Directive can be cited, according to which “(i)n the event of doubt as to whether the supply of incorporated or inter-connected digital content or an incorporated or inter-connected digital service forms part of the sales contract, *the digital content or digital service shall be presumed to be covered by the sales contract.*”⁴⁴

E. Conclusion

- 23 This article has shown that the relationship between smart contracts and the two digital directives is not without problems. It is regrettable that the New Consumer Sales Directive, unlike the Digital Content Directive, does not clearly accept “payment in virtual currencies” (which is currently the case especially with smart contracts) as “payment of price” in the sense of the Directive. In the long run, this could tempt businesses to insist on payment in virtual currencies to escape the scope of the New Consumer Sales Directive. Another problem discussed here was the extent to which smart contracts can be regarded as “digital elements” in the sense of the New Consumer Sales Directive if they are jointly responsible for the functioning or failure of a purchased good by means of a smart device such as a smart lock. In my opinion, there are better arguments in favour of including these smart contract elements in the scope of the New Consumer Sales Directive and not in the scope of the Digital Content Directive. Ultimately, this article is to be understood as a small *amuse-gueule* that hopefully has whetted the appetite of many readers to deal more intensively with the topic presented.

43 See Art. 3(3)2 of the New Consumer Sales Directive.

44 Emphasis added in quote by the author.